Using linguistic typology to enrich multilingual lexicons: the case of lexical gaps in kinship

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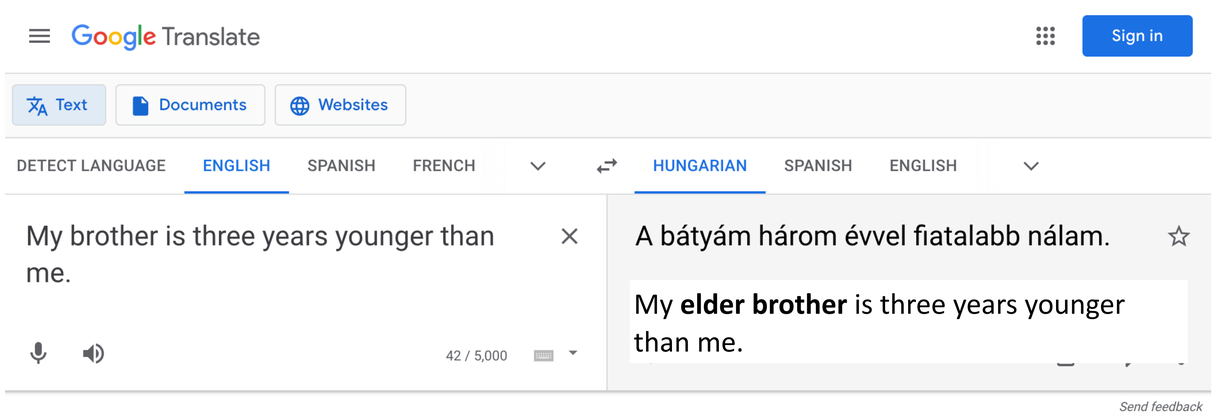
Why is lexical diversity important?

Use of **typology i**n various NLP applications generated consistent improvements; hence, regarded as a promising new direction to tackle the issue of data scarcity in multilingual NLP [1].

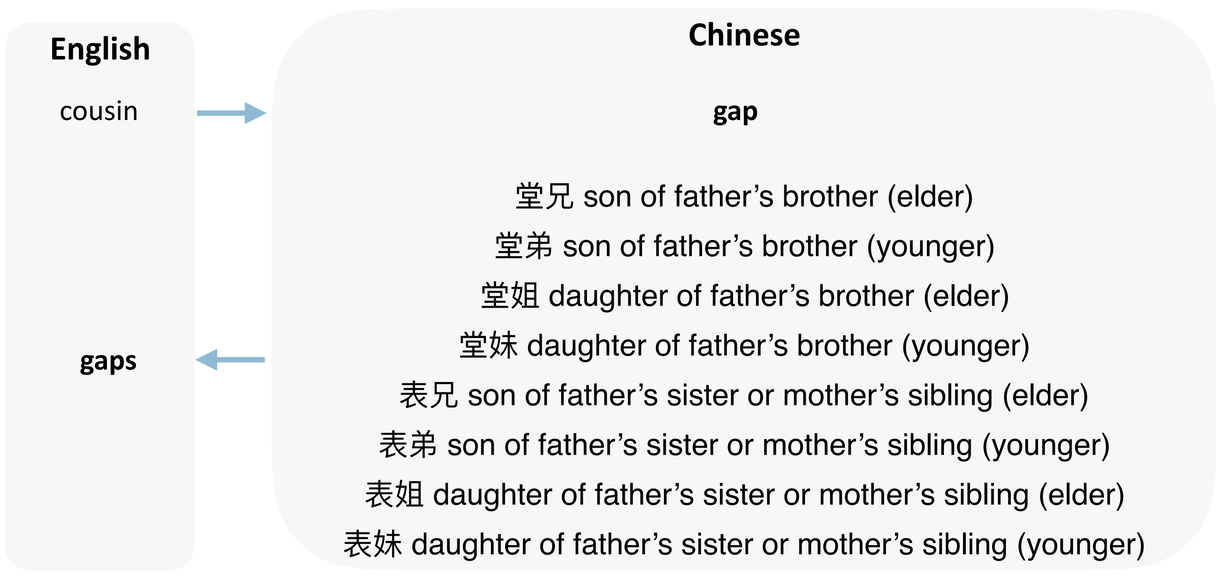
However, most typology-informed NLP studies are limited to morphosyntactic features and have so far ignored **lexical diversity.**

Ignoring diversity in lexicons can lead to hard-to-detect meaning-level mistakes:



What are lexical gaps?

A concept is considered a lexical gap if it can only be expressed through free combinations of words [2].



Methods: How to use lexical typology to infer lexical gaps?

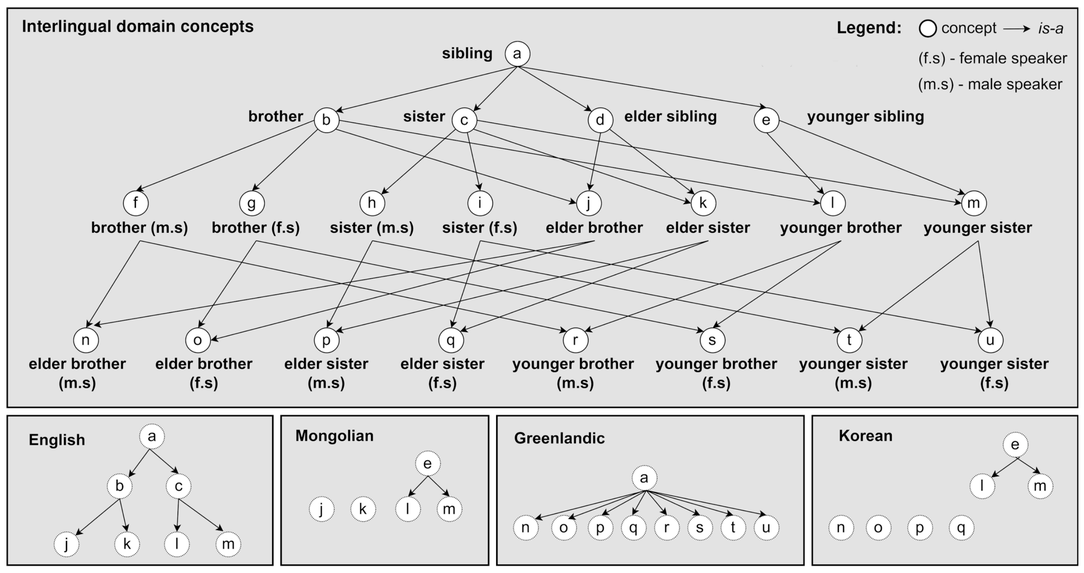
(1) Data collection:

Typological knowledge:
- Murdock's lexicalization patterns [3]
- 566 languages
- 4 subdomains of kinship

Existing resources:
- Wiktionary
- 166 languages, 1681 words
- 6 subdomains of kinship

Native speakers:
- 10 languages, 230 words
- 6 subdomains of kinship

(2) Conceptual modeling:



(3) Gap inference:

For concepts with speaker gender and age undefined:

if neither a concept c nor its parents have a lexicalization in language ℓ then c is a lexical gap in ℓ.

For concepts with speaker gender or age specified:

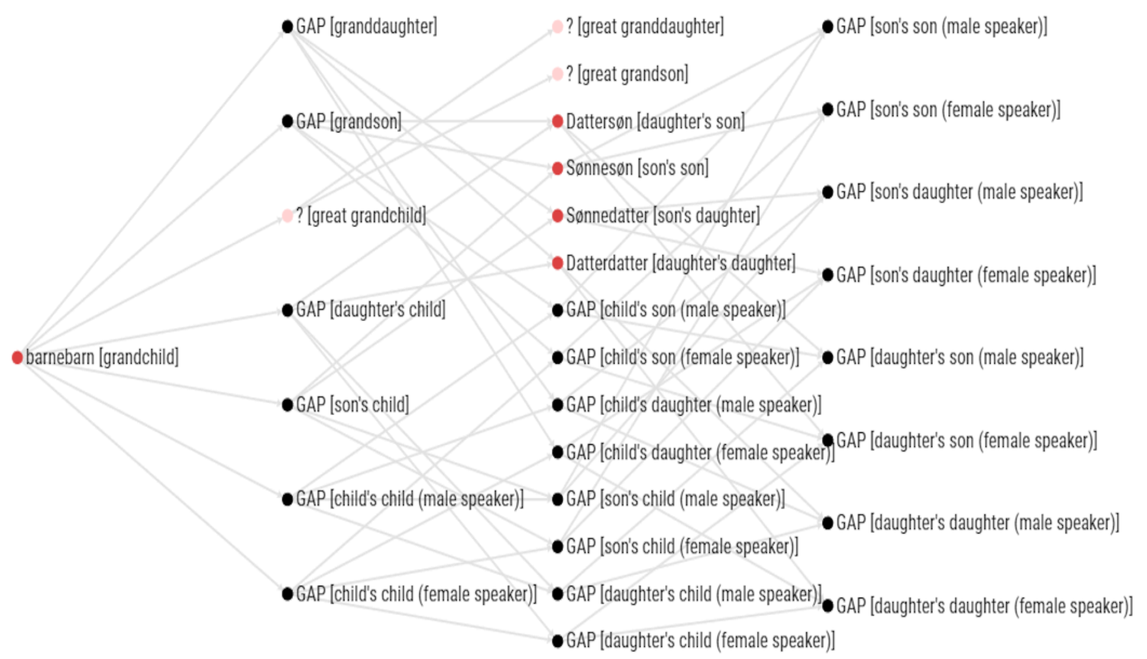
language ℓ is known not to indicate the speaker's gender or age in the lexicalization, then all concepts with these attributes are lexical gaps in ℓ.

Published resource: Availability and visibility

Freely accessible as a stand-alone resource at: http://github.com/kbatsuren/KinDiv
http://ukc.disi.unitn.it/index.php/kinship/

Can be browsed and visualized at: http://ukc.datascientia.eu
http://www.livelanguage.eu

Domain	Concepts	Languages	Words	Gaps
grandparents	19	539	391	7,171
grandchildren	27	247	202	5,049
siblings	21	304	498	3,851
uncles&aunts	31	625	312	16,503
nephews&nieces	33	65	214	1,606
cousins	67	60	294	3,190
Total	**198**	**699**	**1,911**	**37,370**



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References

[1] Ponti, E.M., O'horan, H., Berzak, Y., Vulić, I., Reichart, R., Poibeau, T., Shutova, E. and Korhonen, A., 2019. Modeling language variation and universals: A survey on typological linguistics for natural language processing. *Computational Linguistics*, *45*(3), pp.559-601.

[2] Pianta, E., Bentivogli, L. and Girardi, C., 2002. MultiWordNet: developing an aligned multilingual database. In *First international conference on global WordNet* (pp. 293-302).

[3] Murdock, G.P., 1970. Kin term patterns and their distribution. *Ethnology*, *9*(2), pp.165-208.